CHAPTER 1

INTRODUCTION

1.1 Introduction

Safe driving is a major concern of societies all over the world. Thousands of people are killed, or seriously injured due to drivers falling asleep at the wheels each year. Recent studies show those drivers' drowsiness accounts for up to 20% of serious or fatal accidents on motorways and monotonous roads, which impair the drivers' judgment and their ability of controlling vehicles [6]. Therefore, it is essential to develop a real-time safety system for drowsiness-related road accident prevention.

Many methods have been developed and some of them are currently being used for detecting the driver's drowsiness [7], including the measurements of physiological features like EEG, heart rate and pulse rate, eyelid movement, gaze, head movement and behaviors of the vehicle, such as lane deviations and steering movements. Among those different technologies, ocular measures, such as eye-blinking and eyelid closure, are considered as promising ways for monitoring alertness.

Typically, after long hours of driving or in absent of alert mental state, the eyelids of driver will become heavy due to fatigue. The attention of driver starts to lose focus, and that creates risks for accidents. These are typical reactions of fatigue, which is very dangerous. Usually many exhausted drivers are not aware that they are in falling asleep. In fact, many such drivers can fall asleep any time during their driving. In an image fatigue detection, correct and real time decision is important. Therefore, in this project eyelid closure is chosen to be the method for drowsiness detection when driving.

The current technology in digital computer system allows researchers around the world to study the fatigue behavior. Although the current technology of drowsiness detector has been created, it is lack of efficient since the detection is used ordinary sensor. This project is to develop a driver drowsiness detection system by using histogram analysis. It is known that a driver is under drowsiness influences by looking at the eyelid. Based on the previous research, there is none used histogram for analysis. The result can be not accurate because histogram analysis analyzed the whole image. Therefore, if the analysis area is not specified, the result will be not accurate and efficient. The retina movement shows the fatigue level of the driver. For example, if the driver's eyes are closed about more than 5 seconds in the last 60 seconds, an alarm will sound to alert the driver. Based on the fact that driver's eye movement can be used to recognize the level of drowsiness, a sensor can be developing by using image processing analysis in MATLAB. The image processing analysis that will be used is histogram analysis. This system will be developing only on software part.

1.2 Objective

The objective of this project is to:

i. To develop a system that able to detect drowsiness of a driver based on eyelid detection in digital image.
ii. To make analysis of the eyelid by using histogram features.

1.3 Scope of Project

The scopes that need to be proposed in this project:

i. Focus on image processing tool which is histogram.
ii. Develop on software only.

1.4 Problem Statement

This project is to develop a driver drowsiness detection system by using histogram analysis. It is known that a driver is under drowsiness influences by looking at the eyelid. Based on the previous research, there is none used histogram for analysis. The result can be not accurate because histogram analysis analyzed the whole image. Therefore, if the analysis area is not specified, the result will be not accurate and efficient.